Alberta
ENVIRONMENT

Lesser Slave Lake Regulation Project Information Update
Includes data to January 2000

This information update, prepared by Alberta Environment, provides stakeholders with information on the Lesser Slave Lake Regulation Project.

History
The Lesser Slave Lake area has experienced flooding problems caused by high lake levels since the area was first settled in the early 1900's. After flooding in 1965, the provincial government completed a number of studies to determine how the levels could be controlled. In response to renewed concerns from Lesser Slave Lake area residents in the late 1970's, the Minister of the Environment announced construction of the Lesser Slave Lake Regulation Project. The project, built in 1983, consists of the following lake outlet control works:

- Eight river channel cut-offs located in the first 24 kilometres of the Lesser Slave River downstream of the lake, that moves high lake water out more quickly.
- A weir across the river on the first cut-off below the lake that slows outflow from the lake in low water years. This weir includes a fish ladder to allow fish passage into and out of the lake.

Benefits
The project affects the water level of Lesser Slave Lake in the following manner:

- higher water levels (flooding) do not occur as frequently or as severely,
- low water levels are not as extreme,
- mean water levels are lowered by approximately 0.3 metres over natural conditions,
- overall fluctuation in lake levels is reduced from 3.5 metres to 2.7 metres, and
- flood protection is provided to about 25,500 hectares of agricultural lands surrounding the lake by reducing the frequency and severity of flooding.

The project benefits the fishery resource and many users of the lake and surrounding areas. This includes lakeshore agriculture, recreational users, and communities with water supply intakes. The effect of the project is more noticeable during flood or dry conditions.

Information Update
The conclusions and recommendations of the "Lesser Slave Lake Regulation Status Report – July 1993" are still valid for, and representative of, the project. The two attached figures update the data from the July 1993 Status Report.

Update to Figure 3 – *Lesser Slave Lake Regulation Lake Levels, 1916-1999 (natural and regulated)*

The "natural" lake water levels shown in Figure 3 are for 1916 to 1999. These consist of:

- recorded and infilled data (estimates for unavailable water level data), from 1916 to 1982. These are the water levels which occurred under the natural outlet condition, and

- simulated natural water levels from 1983 to 1999. These are the predicted water levels that would have occurred if the weir and the cut-offs had not been constructed.

The "regulated" lake water levels for the period 1916 to 1999 are the water levels that would have occurred if the weir and the eight cut-offs in the Lesser Slave River had been in place since 1916. These simulated lake water levels are presented in Figure 3.

Update to Figure 4 – *Lesser Slave Lake Regulation – Natural, Regulated and Actual Lake Levels, 1984-1999.*

The "actual" lake water levels are the recorded Lesser Slave Lake levels since the outlet control works were completed. Figure 4 shows the "natural", "regulated" and "actual" water levels for the period 1984 to 1999.

This figure shows that the "recorded" and the "regulated" data series are very nearly coincident, indicating that the Lesser Slave River has almost completely adjusted to the new regime. A review of the data by the department has concluded that the difference between the "regulated" and "observed" levels is not significant, based on a reasonable confidence interval. Currently there are no plans to revisit the model assumptions.

The department will continue to monitor the area. If there appears to be a substantial difference between the expected and actual rating curve for the lake, the 1916-1999 simulation could be re-run.

Summary

The existing analyses, as provided in the attached figures, are the most relevant comparison of the impact the of lake level regulation on Lesser Slave Lake. The contents of the "Lesser Slave Lake Regulation Status Report – July 1993" still apply.

For more Information

Further information can be obtained by contacting the Alberta Environment, Regional Services, Northern Region office in Peace River at (780) 624-6167.

Attachments

Figure 3 - *Lesser Slave Lake Regulation Lake Levels, 1916-1999 (natural and regulated)*
Figure 4 - *Lesser Slave Lake Regulation – Natural, Regulated and Actual Lake Levels, 1984-1999*

Reference

Alberta Environmental Protection, 1993. Lesser Slave Lake Regulation Status Report. Prepared by Planning Division, Alberta Environmental Protection. Edmonton, Alberta. July 1993. 24 pp.

Prepared by Alberta Environment - Regional Services, Peace River and Hydrology Branch, Edmonton - April 2002.

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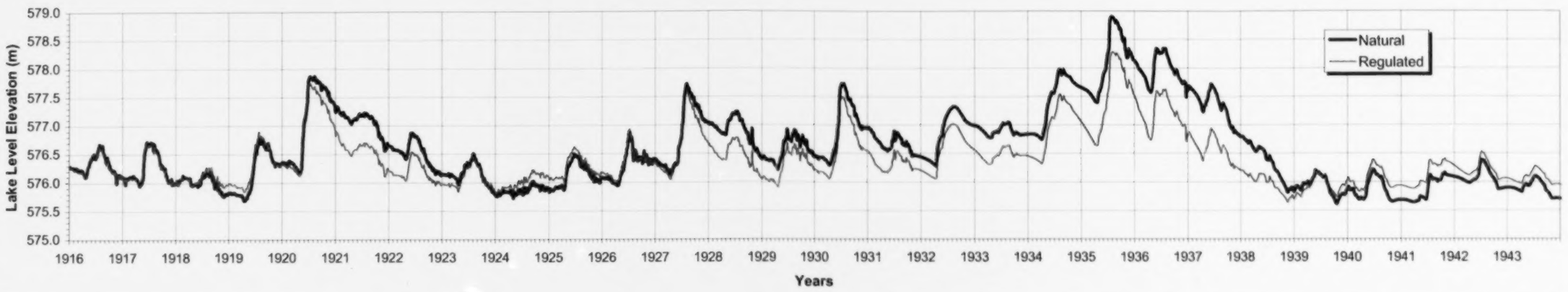
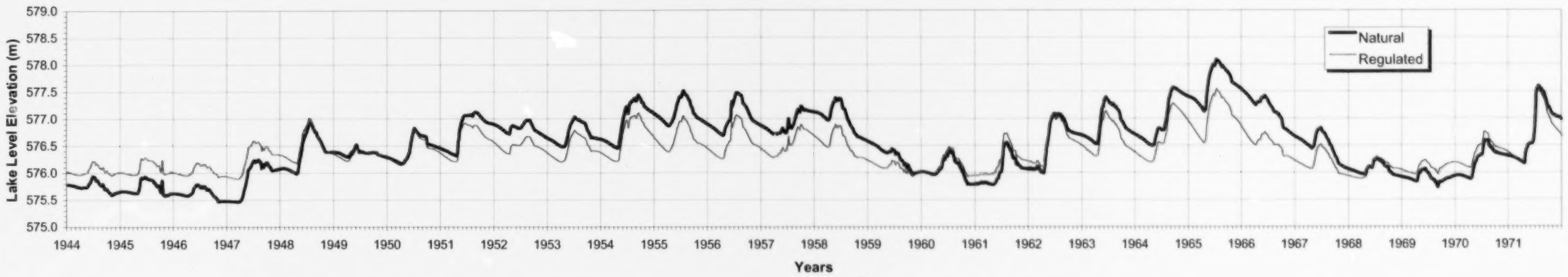
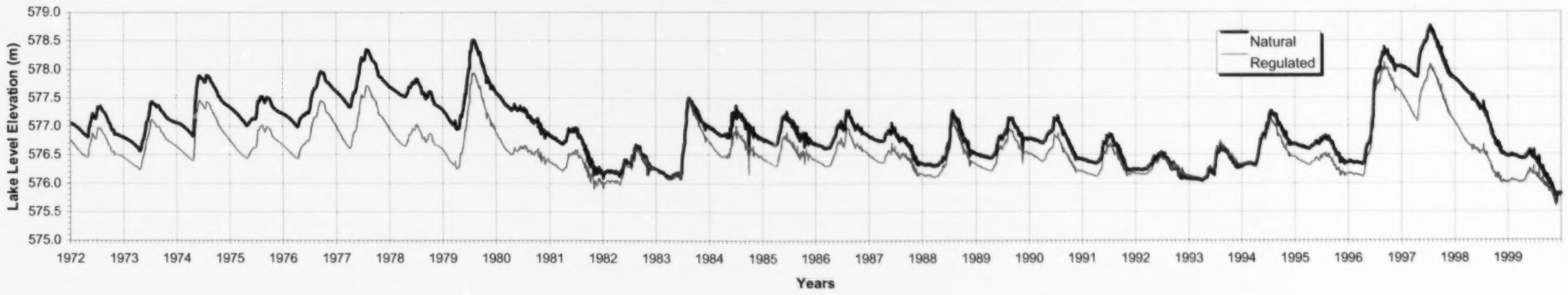


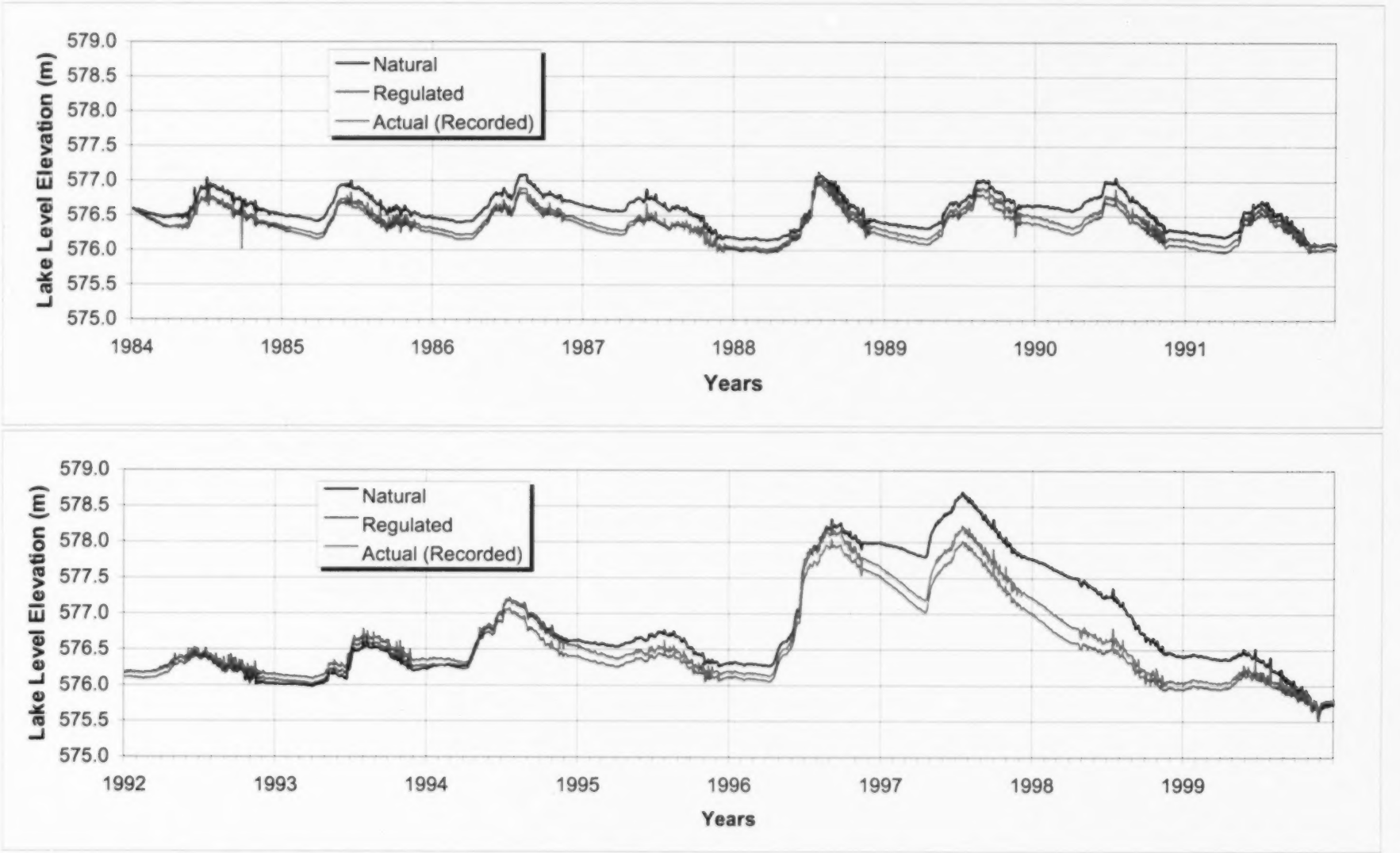




SOURCE: HYDROLOGY BRANCH, ALBERTA ENVIRONMENT (2001)

LESSER SLAVE LAKE REGULATION

FIGURE 3: LAKE LEVELS, 1916-1999



LESSER SLAVE LAKE REGULATION

FIGURE 4: NATURAL, REGULATED AND ACTUAL LAKE LEVELS, 1984-1999

SOURCE: HYDROLOGY BRANCH, ALBERTA ENVIRONMENT (2001)